Sustainable Accounting: The Benefits and Challenges of its Implementation

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Abstract

This thesis is centered around the idea that sustainability is a necessary component within the world. Environmental, social, and governance (ESG) factors are key components of analyzing sustainable practices. Although accountants have historically focused on financial reporting, they now have the added function of sustainable accounting as environmental implications are an area of concern for companies. A substantial component of this thesis centers around analyzing how ESG factors contribute to an organization's financial performance. It also observes how comprehensive sustainability reports impact investor decisions and examines the challenges that auditors face when providing assurance for sustainability initiatives. Furthermore, it examines how governments encourage sustainability practices through incentive programs and highlights how emerging technologies such as blockchain and AI can improve the reporting of sustainability reports.

Key words: sustainable accounting, sustainability, ESG, GRI, investors, auditors, blockchain, AI

Sustainable Accounting: The Benefits and Challenges of its Implementation

Background

The Earth as a planet has numerous resources that are finite. Ensuring that these finite resources are utilized effectively is important for the wellbeing of people. Sustainability is the concept that describes this phenomenon as it is known as the ability to grow while maintaining natural resources for the future. Sustainable development practices have seeped throughout the world as more individuals are becoming aware of the different environmental implications that are impacting the planet. Ensuring that each person, family, and company is operating in a sustainable manner is an important process that must occur for the planet's future. One of the many industries that has been impacted by the concept that sustainability is important is the accounting industry.

The term accounting is most commonly associated with financial reporting and regulations. "Accounting was first applied over 5,500 years ago in Iraq" (Bennett, 2015, p. 6). The first signs of accounting were basic as they were displayed through the purchase and sale of livestock and crops. However, even in its early stages accounting displayed signs of its modern function. "The Hammurabi Code, written almost four thousand years ago, includes a law preventing a merchant from recording a transaction unless he has sealed and signed off on the receipt of money" (Bennett, 2015, p. 6). Since the basic principles of accounting have been developed for so long, it has allowed numerous rules and regulations to be created to ensure that both people and businesses are operating fairly within a marketplace. "Congress passed the Securities Acts of 1933 and 1934 that created the Securities and Exchange Commission; required companies to keep accurate books, records, and accounts, and specified maintenance of a system of internal accounting controls allowing the preparation of financial statements in accordance with Generally Accepted Accounting Principles" (Bennett, 2015, p. 9). These regulatory principles shaped how companies are able to operate and not following these rules and regulations can have numerous impacts on how a company can operate. Companies that fail to comply with the accounting rules in the area they are working in receive harsh legal penalties, fines, and lawsuits. The Generally Accepted Accounting Principles, also known as GAAP, provides standards that dictate how financial audits are conducted. This standard setting agency provides the marketplace with stability as people are able to invest in companies, allowing businesses to grow, due to the audited financial statements. Accounting has developed into a larger entity as it has now begun to spread into areas that are not in the financial performance realm.

Sustainable accounting is one main area that accounting has shifted into that is not traditionally associated with the financial statements of an organization. Sustainable accounting is a relatively new concept within the realm of accounting, but possesses some major implications of how the world will operate in the future. Sustainable accounting is the concept of analyzing and describing an organization's environmental implications. This concept allows beneficial sustainable actions of companies to be positively reflected within their accounting documentation. However, it is difficult to determine how to place a specific value on a company's sustainable actions as many of them do not outwardly cause a profit.

The concept of sustainable accounting is commonly displayed through the terminology environmental, social, and governance data, more commonly referred to as ESG. Companies that adhere to ESG values perform better than companies that fail to evaluate how ESG can benefit their company. "In essence, accounting and corporate reporting activities achieve their goal if the consequent disclosure pertains not only to the exact financial position of a company, but also to its impact on the referential communities, the ecosystems and the entire planet" (Comoli et al, 2023, para 1). By adhering to ESG standards, companies can have better investor relations than companies that do not adhere to ESG values. The modern investor, the driving force of the current financial landscape, has the ability to choose what companies he wants to invest in. Companies that adhere to sustainable practices and display them within their public documentation are more likely to be invested in than other companies.

The Global Reporting Initiative is a sustainability reporting group that sets standards for companies to follow globally. The Global Reporting Initiative (GRI) is the most widely used global standard for sustainability reporting and continues to grow as more companies integrate the practice, (del Mar Alonso-Almeida et al, 2014). Before GRI's creation in 1997, there was no general consensus about how to measure or report sustainability initiatives. This caused investors, analysts, and other company stakeholders to encourage the creation of a set of standards that can be used globally (Lozano and Huisingh, 2011). GRI provides a framework for companies to report their sustainability initiatives across a global scale.

Corporate Social Responsibility, also known as CSR, refers to the idea that organizations have an obligation to society other than just making profits. This idea is being accepted by stakeholders, causing people to begin to oversee how an organization's actions impact the local community. As these stakeholders have changed their societal stances, organizations' corporate reporting has become a major factor in their decision making (García‐Sánchez et al., 2019). CSR utilization is a major component in the increased usage of sustainability reporting on a global scale.

Thesis

It is important for organizations to prioritize their sustainability reporting as it impacts the world's well-being. Creating a universal measuring system for sustainable practices that describes both quantitative and qualitative data would provide a comparison point between companies. Investors hold a major role in encouraging companies to improve their sustainability reporting. The countries of the world and companies have a crucial role to play in developing sustainability initiatives that benefit the world. How does the integration of environmental, social, and governance (ESG) factors in financial reporting contribute to the overall sustainability performance of organizations? What impact does the availability of comprehensive sustainability data have on investor decisions? What challenges do auditors face in providing assurance for sustainability reports? How does the regulation of sustainability initiatives by countries impact what companies provide in their sustainability reports? Can technology enhance the transparency and traceability of sustainability data in financial reporting?

Research Questions

How does the integration of environmental, social, and governance (ESG) factors in financial reporting contribute to the overall sustainability performance of organizations?

The adoption of environmental, social, and governance standards causes a company to act differently then it would without considering these factors. How does a company act differently when considering ESG factors? Is a company better off financially by following ESG standards?

What impact does the availability of comprehensive sustainability data have on investor decisions?

Investors are the central driver of the modern economy as they provide funding for organizations. Do investors consider the sustainability score of companies? Are sustainability reports reliable for investor decisions?

What challenges do auditors face in providing assurance for sustainability reports?

Auditors provide assurance for financial information of companies. How do auditors ensure that the sustainability reports are accurate? Why is standardized reporting needed for sustainability reports?

How does the regulation of sustainability initiatives by countries impact what companies provide in their sustainability reports?

Numerous countries have begun mandating certain sustainability reporting, increasing the amount of companies that have reports. How does mandatory sustainability reporting dictate what is done by companies? What kinds of incentives are provided to encourage sustainability efforts?

Can technology enhance the transparency and traceability of sustainability data in financial reporting?

Utilizing technology is a major component of both tracking and recording financial data and sustainability data. How has technology improved sustainability reporting? How can the integration of blockchain and AI improve sustainability reporting?

Summary

Normal business operations have an inherent impact on the environment, making the tracking of how businesses are impacting the environment an important factor to consider for companies. These seemingly non-financial factors focusing on environmental impacts have a legitimate financial implication due to how environmental change impacts businesses.

Stakeholders are becoming increasingly aware and concerned about how environmentally friendly companies are. Even with increased public pressure and increased research on how the environment is changing due to business operations, businesses are slow to change their actions on such efforts. Research dictates that the standards that are currently employed to encourage large companies to change how they operate to deter climate change will be futile in the short term, however, highlighting environmental visibility would encourage businesses to alter their practices and function more sustainably (Atkins et al., 2015).

Main Research

The continuation of this essay focuses on some major questions concerning sustainable accounting practices. There are numerous efforts taken to track and display data concerning environmental practices. These efforts are important for both encouraging change in operations and to inform businesses of how their practices are impacting the environment. Sustainability is ultimately a global concern, highlighting the importance of developing sustainable practices within multinational corporations.

How does the integration of environmental, social, and governance (ESG) factors in financial reporting contribute to the overall sustainability performance of organizations?

How does a company act differently when considering ESG factors?

Companies that prioritize ESG reporting conduct more detailed risk management reporting and consideration, making ESG reporting valuable in determining potential risks that a company may undertake. Research suggests that companies in India that perform better ESG risk management also have better total risk management functions and are also better prepared to absorb shocks within the market (Sharma, 2023). The companies that utilize ESG reporting are considering more risk factors than their competition, resulting in a more comprehensive risk management perspective. By adding risk factors that are centered around the ESG pillars, environmental, social, and governance the companies have a more holistic view on what risks and changes may occur within the market. These risks are getting more attention as more nations begin to mandate the adoption of ESG practices in their company's financial reporting guidelines. "As the influence of ESG risks can be expected to increase over time, the risk management team should be in a position to assess whether ESG risks are becoming material financial risk drivers and, where appropriate, use all the available risk monitoring and mitigating tools for the relevant exposures" (Birindelli et al., 2022, p. 27). To maintain an updated risk management plan, organizations must continue to monitor and update their ESG reporting framework to better prepare for market changes. ESG reporting standards are still relatively new, making it likely that the most optimal usage of ESG data for risk management purposes has not been developed yet.

Is a company better off financially by following ESG standards?

ESG has maintained its status as one of the most known and utilized tools for tracking and analyzing sustainability practices within organizations. ESG data analysis has exploded within major cap companies displayed through the sustainability reporting within large corporations. 92% of companies that are housed within the S&P 500 published specific sustainability reporting documentation in 2020, increasing from the 2019 total of 90% while 70% of the Russell 1000 companies published a sustainability report in 2020, increasing from the 65% published in 2019" (Coppola, 2021). The S&P 500 houses 500 of the most stable and successful companies within the U.S. stock market, the largest in the world. While the Russell 1000 houses 1000 of the highest market capitalization companies within the U.S. The trend of these companies implementing sustainability reporting demonstrates how sustainability can create long term value for the companies. These sustainability reports have been a necessity for companies to implement as in 2012, only 20% of companies within the S&P 500 published a sustainability report (Coppola, 2021). In studies conducted by Gallego-Álvarez et al. (2010) deduced that ESG reporting/practices create lasting positive value and improve a corporation's reputation. The increasing usage and data determining the success of implementing ESG data into a company's evaluations highlights how beneficial utilizing the data can be for companies over time.

What impact does the availability of comprehensive sustainability data have on investor decisions?

Do investors consider the sustainability score of companies?

The modern investors have immense value to the financial well-being of companies through the use of the stock market. Investors can directly impact companies by investing in their stock which provides funding for the business to use in its operations. In an effort to understand the company an investor is considering investing in, they analyze numerous metrics to determine what companies are best suited for investment. Due to the rise in sustainability usage in companies, investors are becoming increasingly aware of the sustainability efforts in companies. "If you ask most investors, they will tell you that there is at least an awareness of environmental and social concerns" (Atkins et al., 2015 p. 662). By being aware of a company's environmental, social, and governance efforts, investors can choose to invest in companies that are benefiting their community. "A subset of ESG data are "value-laden" for specific industry sectors, that corporate managers can increase the ratio of dedicated investors (compared to transient) in their investor base through ESG" (Tamimi & Sebastianelli, 2017, p. 1674). This highlights how companies have noticed that investors are more willing to invest in companies that provide sustainability reporting. The better a company is performing in its ESG metrics, the more likely investors are to contribute to the company.

Are sustainability reports reliable for investor decisions?

Many sustainability's reporting reports focus on three key factors: environment, social, and governance. Research has concluded that ESG scoring tools tend to rate the efforts of companies by valuing governmental factors the most, social factors in the middle, and environmental factors the least valuable for the scoring (Tamimi & Sebastianelli, 2017). This demonstrates that when investors utilize the data from sustainability reporting, governance tools will be the largest dictator in the data that is provided. It has also been demonstrated that governance data consists of the largest percentage of reporting, as it is the only area that has true regulations (Tamimi & Sebastianelli, 2017). Figure 1 displays how environmental, social, and governance practices are represented within S&P 500 companies ESG scoring.

Descriptive statistics of ESG disclosure scores

	E	S	G
Mean	25	30	58
Median	20.98	26.80	57.14
SD	18.05	15.3	6.84
Minimum	1.38	3.33	37.5
Maximum	79.84	73.43	80.36
n	347	347	347

Figure 1. (Tamimi & Sebastianelli, 2017). *Transparency among S&P 500 companies: An analysis of ESG disclosure scores. Management Decision*

Through this phenomenon, it can be interpreted that many of these companies are not being proactive in their sustainability efforts and reporting since they are not mandated to publish data regarding environmental and social factors. Governance's high percentage and weight in ESG scores make the data from the scores less valuable as companies that do complete great environmental or social factors are factored less than governance factors.

Although sustainability reporting and scores have flaws, they still provide extra, non-financial information for investors to make decisions. “The latest research findings suggest that when forecasting future earnings, analysts should trust the information published on CSR performance and the company's use of this information, studies also show that the accuracy of external forecasts depends not only on the breadth and quality of the information supplied but also on the level of coverage by analysts” (García‑Sánchez et al., 2019, 1393) This research displays that sustainability reporting is a valuable component in analyzing the future success of companies. The increased usage of these reports in investor analysis encourages companies to improve their data collection and analysis of sustainability measures. “Companies have an incentive to improve their information disclosure practices, in the expectation that this will increase the number of analysts monitoring their performance, which in turn will reduce forecast dispersion” (García‑Sánchez et al., 2019, 1402). The increased visibility of the companies make the reports valuable for investor decisions.

What challenges do auditors face in providing assurance for sustainability reports?

How do auditors ensure that the sustainability reports are accurate?

An auditor has one of the most important functions in maintaining the validity of financial information within the market. Auditors provide assurance that companies are representing their financial statements accurately and fairly. Auditing is also a necessary component of determining the validity of sustainability reporting. The auditing for sustainability reporting is more different as it focuses on determining the validity of non-financial factors. “The audit procedures performed for the verification of non-financial reports refer to understanding the specific industry sector, business management and organizational model, governance processes and the sustainability strategy of the company; review materiality analysis; evaluation of the reporting processes, data capture and compilation methods of non-financial information; analytical procedures and tests of detail performed for testing the non-financial information; verification of compliance with applicable reporting requirements as established by laws and reporting frameworks" (Buica et al., 2021, p. 708). To properly provide assurance for sustainability reporting, significant time and resources are needed by auditors to check and verify that the reports are accurate and impact stakeholders in the manner that the reports state. The methods in which auditors use to provide assurance for sustainability reports are similar to those of financial reporting. Some main methods of testing and verifying sustainability reporting are inquiry, observation, inspection, re-performance, confirmation, and analytical procedures (Buica et al., 2021). The methods of providing assurance follow the same principles and practices that dictate traditional, financial accounting assurance. The methodology of these assurance statements allows the reports to be transparent and gives them credibility for stakeholders and investors to believe the information that is in the reports.

Why is standardized reporting needed for auditing sustainability reports?

Creating standardized reporting guidelines for sustainability reporting is a major component of allowing auditors to provide assurance for sustainability reporting. A key component of developing standardized reporting would be to allow comparability and set clear guidelines that dictate if companies are successful in their sustainability initiatives. The most used standard setting body for developing guidelines is the Global Reporting Initiative. "The GRI framework provides the opportunity to compare information and conduct benchmarking among the different organizations involved" (del Mar Alonso-Almeida et al., 2014, p. 320). The

Global Reporting Initiative's impact on auditors is providing a clear, standardized framework for auditors to follow when determining the accuracy of the reporting.

However, the GRI does not completely encompass everything needed by auditors to provide assurance for reporting. The GRI's criteria and setup does not allow for scoring or benchmarking to be compared by companies in different industries since the scoring is different for each industry (Diaz‑Sarachaga, 2021). This makes the most recognized and utilized sustainability standard setting organization to fail to allow for comparisons across industry. Auditing guidelines for the standard setting board are not necessarily being created for the long term analysis of sustainability reporting. Research shows that many organizations are displaying data for new sustainability initiatives, however, once they begin reporting the new initiatives, they stop reporting on previous initiatives (Chersan & Cuza, 2016). Figure 2 displays this data by highlighting how the reporting standards of G3 and G3.1, decreased in usage once G4 was introduced in 2014.

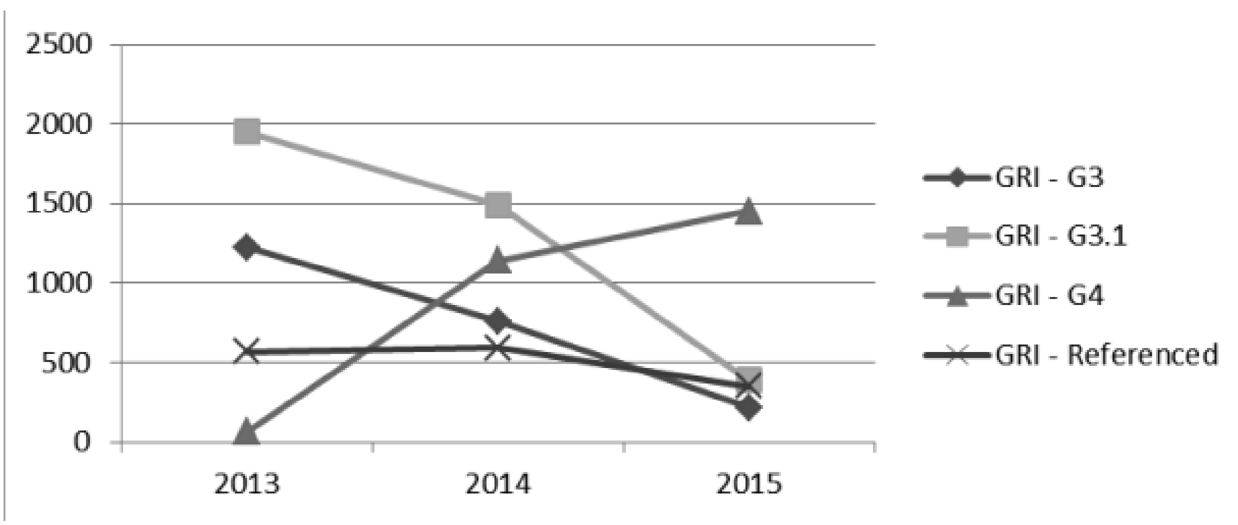


Figure 2. (Chersan & Cuza, 2016). *Corporate responsibility reporting according to global reporting initiative: An international comparison*

The GRI does not encompass terminology or standards that penalize organizations for stopping their sustainability efforts on previously high ticket items. This makes the GRI's standards ineffective for auditors to follow as its methods create limited transparency and comparability across companies. When these organizations stop reporting on previous guidelines, it implies that they do not continue these practices when new practices, that are tracked, are created.

How does the regulation of sustainability initiatives by countries impact what companies provide in their sustainability reports?

How does mandatory sustainability reporting dictate what is done by companies?

As sustainability has become a bigger concern for global governments, sustainability reporting has become a necessary component for many companies. Mandatory reporting requires companies to publish specific data regarding certain subjects. "The US House of Representatives has passed the ESG Disclosure Simplification Act, 2021 which defines and standardizes the ESG metrics for mandatory corporate disclosures" (Desai, 2024, p. 237). Other countries such as China and India have created even more rigid reporting guidelines that require that certain metrics be displayed within their company's annual reports (Desai, 2024). By providing mandatory reporting guidelines, governments are creating areas that are universally reported, however, companies are being reactive in their sustainability reports by not publishing any data until they are mandated to by a governing body (Tamimi & Sebastianelli, 2017). The areas that are typically covered by mandated reporting can be categorized as governance reporting as it is the area of sustainability that is the most regulated. The non-mandated areas, namely social and environmental factors are left behind and not focused on by most companies. Companies' lack of initiative on developing their own sustainability practices can be attributed to a lack of shareholder pressure and through a cost-benefit analysis of the reporting. This highlights how many companies are not interested in producing actual sustainability unless it helps them financially.

Mandatory reporting is seen as an opportunity to force companies to prioritize ESG practices within their organizations. By forcing reporting of ESG components, theoretically there would be more published information about ESG and the reports would be more thorough. However, mandatory reporting can have a negative impact on the amount and quality of ESG (Zhang et al., 2023). When mandatory ESG standards are in place, companies prioritize adhering to the standards and do not actively engage in ESG reporting that falls outside the mandatory requirements. The same study focusing on nearly 80,000 mandatory ESG reporting occurrences between 2000-2020, concludes that mandatory reporting increases the quantity of ESG data available, but does not improve the quality of the information (Zhang et al., 2023).

What kinds of incentives are provided to encourage sustainability efforts?

To promote corporate sustainability efforts, governments have provided incentives for reporting on metrics. These incentives can include corporate tax breaks, the increased chance for governmental aid in funding ventures, and compensation for the decision makers within organizations. These incentives are offered to improve the likelihood that companies develop their sustainability programs. The most effective measure in encouraging sustainability efforts is the creation of incentive-programs. Companies that create incentive-based compensation programs meet more often and develop more action-based sustainability functions than companies that do not provide compensation (Ikpor et al., 2024). Research shows that developing incentive-based compensation based on sustainability initiatives for high ranking officials positively improves sustainability reporting (Ikpor et al., 2024). By incentivizing companies to practice sustainable practices, more companies are reporting their sustainable efforts.

Can technology enhance the transparency and traceability of sustainability data in financial reporting?

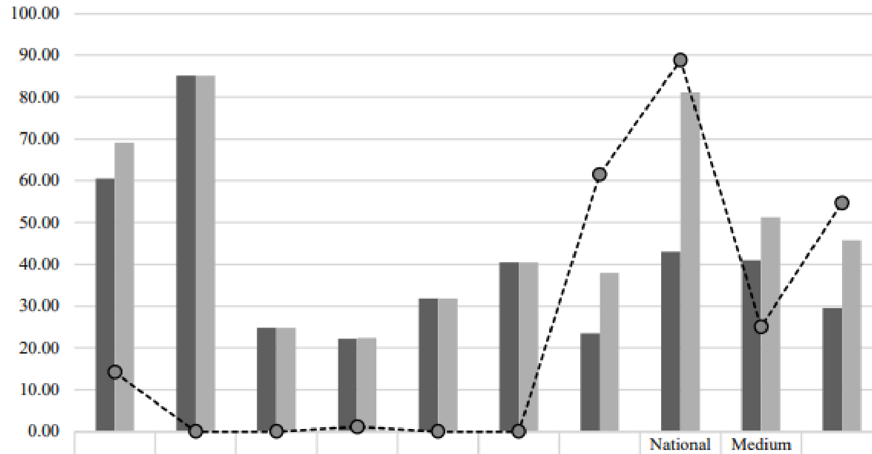
How has technology improved sustainability reporting?

The integration of technology within sustainability reporting is improving as it has been developed as the main method by which sustainability data is collected and shared. Most sustainability reporting is completed by digital means, and it is most commonly distributed to stakeholders and investors through digital formats, making technology integral to sustainability reporting. “Digital technologies are considered to be real drivers in sustainability reporting, as companies must effectively manage the large amount of information related to environmental, social, and governance factors and integrate them into existing reporting systems” (Mehedintu & Soava, 2023, p. 18). The reliance on technology for collecting and storing sustainability reporting data provides a centralized format for the storage of the data, creating a common place for stakeholders to look for the data. It also allows for years of data to be housed in the same place, improving the comparability of data between different organizations. Research also indicates that the application of current technologies within sustainability development at the company level leads to the sustainable protection of the environment by reducing polluting factors (Mehedintu & Soava, 2023). The technologies that improve sustainability measures include the use of enterprise resource planning systems and through data analytics systems. Enterprise resource planning systems consolidate all of an organization’s sustainability information in a centralized location, allowing decision makers to make informed decisions about how to operate in a sustainable manner. Data analytics systems provide the foundation for companies to identify places within their organization to decrease their total environmental footprint (Mehedintu & Soava, 2023). These technologies are integral for the collection and continued development of sustainable operations.

How can the integration of blockchain and AI improve sustainability reporting?

Blockchain is a prominent technology of the future that could have implications on sustainability reporting. Blockchain is defined as, “an immutable, distributed, and decentralized digital ledger designed to record and transmit information across parties” (Bakarich et al., 2020, p. 392). A common usage of blockchain is to ensure the security of financial information through tracking technology to identify financial irregularities (Mehedintu & Soava, 2023). The implementation of blockchain functions within sustainability reporting could allow for the results of the reports to be evaluated quickly and provide more assurance than current channels. “Blockchain possesses the potential for real-time financial reporting and validation by auditors, both internal and external” (Bakarich et al., 2020, p. 396). This real-time data verification that blockchain can provide would allow sustainability reporting to be updated in “real time”. Historically, all accounting information is collected in a historical lens as a report that is dated for the year end is completed weeks or months later. By implementing blockchain, a ledger can be created that receives secure data that can be verified by external auditors instantly (Bakarich et al., 2020). The instantaneous updating of information with numerous built in assurance checks makes the implementation of blockchain the blueprint for the future. Blockchain will enable companies to evaluate more data in less time, improving the potential for sustainability reporting initiatives.

The implementation of artificial intelligence technologies are another major, recent technological advancement that could have a massive impact on how sustainability is tracked and analyzed in the present and future. AI is increasingly being utilized as a tool to help both organizations and individuals evaluate data. “The increased demand for the integration of information and communication technologies at the level of companies’ activity shows a tendency to automate and achieve the exchange of information through new technologies” (Mehedintu & Soava, 2023, p. 4) The increased quantity of data allows AI to be a great tool for evaluating data as it would take too long for individuals to evaluate it quickly. Figure 3 displays data from Israel highlighting how utilizing AI optimization technology can impact the quality of sustainability results. Figure 3 conducts this by analyzing how different industries could improve their sustainable actions by showcasing how the quality improvements assessed through the use of AI would have impacted the industry. Figure 3 indicates that increasing the amount of talent, research, and commercial investment within the country would cause an increase in the national rates of sustainability reporting, tech manufacturing, and technology exports.



	Talent	Infrastrusture	Operating Environment	Research	Development	Government Strategy	Commercial	National rates of sustainability reporting	Medium and high-tech manufacturing	High-technology exports
The value in 2022	60.50	85.10	24.80	22.20	31.80	40.50	23.50	43.00	41.00	29.59
The value during optimization	69.09	85.10	24.80	22.45	31.80	40.50	37.95	81.20	51.27	45.75
The increase in the value during optimization compared to 2022, %	14.19	0.00	0.00	1.12	0.00	0.00	61.48	88.84	25.04	54.62

Figure 3. (Karbekova et al., 2023). *Automation based on datasets and ai of corporate accounting and sustainability reporting in quality management in industry 4.0. Proceedings on Engineering Sciences*

"The advantage of the improved mechanism is the higher effectiveness of management information systems of enterprises in industry 4.0, which contributes to the expansion of their production and development of exports due to the growth of loyalty of stakeholders and an increase in sales" (Karbekova et al., 2023, p. 276). Through the use of AI, companies can improve their current sustainability initiatives. AI technology continues to improve, making the usage of AI a key component of the future of sustainability practices.

Conclusion

Sustainable accounting is a new phenomenon as people have determined that sustainability is a major concern for the future. When companies track ESG factors, their overall risk management is improved as they are observing more information than companies that fail to track ESG factors. Companies also see better financial performance when adhering to sustainable reporting practices. This can be attributed to investors' increased concern regarding sustainable practices. Investors have immense sway in the current market as their decisions can both help and hurt companies financially. In their current format, however, these reports cannot be relied on completely as they are skewed toward certain factors that are regulated. This is discouraging for sustainable development as the scoring metrics do not encourage companies to create their own sustainability initiatives, as the scoring fails to reward them for it. A key reason for this scoring style is due to mandatory guidelines, these guidelines are the main skew for sustainability metrics as these values hold more weight than other initiatives. These reports still hold value as they provide investors with more information than past reporting.

The standardization of these reporting guidelines is a crucial component of ensuring that companies are operating sustainably. However, in the current form, reports are not uniform, making comparison less than optimal. There is also not a way to compare companies across industries as every industry has different standards. Comparison is crucial for sustainability reporting to allow auditors to provide assurance and comparisons between different companies. Technology has a major impact on the standardization of reporting as it is the main tool that is used to record sustainability. In an increasingly digital world, new tools such as data analytics and enterprise management systems provide key information for reporting in a centralized location. Blockchain and AI provide great benefits for the future of data collection as they offer real-time data verification and automation respectively. These technologies offer the potential to increase both the quality and quantity of information that is housed within sustainability reports.

Areas where information was scarce during research include finding specific components of sustainability reports. There is information regarding where companies score and the amount of components, initiatives held within the reports, but there is a lack of an adequate description to evaluate what a company is actually doing. This stems from a lack of regulation on what needs to be published in ESG reports and makes it difficult to make comparisons at the company level since the data is incomplete. There was also a lack of information regarding how accounting governing bodies are suggesting the auditing of sustainability reporting. There is no information from the Federal Accounting Standards Board, FASB, on how sustainability reporting should be audited. This may occur because sustainability reporting is not mandatory within the United States. FASB's core function is setting the standards that auditors follow when reviewing financial reports, making it the potential source for creating the standards for sustainability reporting in the future.

References

Atkins, J., Atkins, B. C., Thomson, I., & Maroun, W. (2015). “Good” news from nowhere: Imagining utopian sustainable accounting. Accounting Auditing & Accountability Journal, 28(5), 651-670. https://doi.org/10.1108/AAAJ-09-2013-1485

Bakarich, K. M., Castonguay, J. “., & O'Brien, P. E. (2020). The use of blockchains to enhance sustainability reporting and assurance. Accounting Perspectives, 19(4), 389-412. https://doi.org/10.1111/1911-3838.12241

Bennett, D. (2015). A history of accounting. The Armed Forces Comptroller, 60(1), 6.

Birindelli, g., Bruno, M., Citterio, A., Fuso, U., Genero, G. L., Magurano, A., Oliwer Wyman, Sapienza University, University of Insubria, Intesasanpaolo, Oliver Wyman, & University of Chieti Pescara. (2022). Banks' governance and risk management frameworks: How to integrate ESG and climate risks. Risk Management Magazine (Online), 17(1), 25-35. https://doi.org/10.47473/2020rmm0103

Buica, N. A., Avram, M., & Mihai, M. (2021). Financial audit procedures employed in sustainability assurance. "Ovidius" University Annals. Economic Sciences Series (Online), XXI(1), 703-709.

Chersan, I., & Alexandru Ioan Cuza” University of Iasi, Romania. (2016). Corporate responsibility reporting according to global reporting initiative: An international comparison. Audit Financiar (Bucharest, Romania), 14(136), 424-435. https://doi.org/10.20869/AUDITF/2016/136/424

Comoli, M., Tettamanzi, P., & Murgolo, M. (2023). Accounting for 'ESG' under disruptions: A systematic literature network analysis. Sustainability (Basel, Switzerland), 15(8), 6633. https://doi.org/10.3390/su15086633

Coppola, L. D. (2021). 92% of S&P 500® companies and 70% of Russell 1000® companies published sustainability reports in 2020, G&A Institute research shows. GlobeNewswire News Room. https://www.globenewswire.com/news-release/2021/11/16/2335435/0/en/92-of-S-P-500-

del Mar Alonso-Almeida, M., Llach, J., & Marimon, F. (2014). A closer look at the 'global reporting initiative' sustainability reporting as a tool to implement environmental and social policies: A worldwide sector analysis. Corporate Social-Responsibility and Environmental Management, 21(6), 318-335. https://doi.org/10.1002/csr.1318

Desai, R. (2024). Nexus between mandatory ESG disclosure regulation and abnormal stock returns: A study of an emerging economy. International Journal of Law and Management, 66(2), 236-258. https://doi.org/10.1108/IJLMA-07-2023-0154

Diaz‐Sarachaga, J. M. (2021). Shortcomings in reporting contributions towards the sustainable development goals. Corporate Social-Responsibility and Environmental Management, 28(4), 1299-1312. https://doi.org/10.1002/csr.2129

Gallego-Alvarez, I., Prado-Lorenzo, J., Rodriguez-Dominguez, L., & Garcia-Sanchez, I. (2010). Are social and environmental practices a marketing tool? empirical evidence for the biggest european companies. Management Decision, 48(10), 1440-1455. https://doi.org/10.1108/00251741011090261

García‐Sánchez, I. M., Gómez‐Miranda, M., David, F., & Rodríguez‐Ariza, L. (2019). Analyst coverage and forecast accuracy when CSR reports improve stakeholder engagement: The global reporting Initiative‐International finance corporation disclosure strategy. Corporate Social-Responsibility and Environmental Management, 26(6), 1392-1406. https://doi.org/10.1002/csr.1755

Ikpor, I. M., Akanu, O. O., Ugwu, J., Gabriel Obasi Chidozie Udu, Ulo, F. U., Achilike, N., Adama, L., & Oganezi, B. (2024). Influence of board governance characteristics on sustainability accounting and reporting in a developing country: Evidence from nigeria large businesses. SAGE Open, 14https://doi.org/10.1177/21582440231224235

Karbekova, A. B., Makhkamova, S. G., Inkova, N. A., & Pakhomova, O. K. (2023). Automation based on datasets and ai of corporate accounting and sustainability reporting in quality management in industry 4.0. Proceedings on Engineering Sciences (Online), 5(S2), 265-278. https://doi.org/10.24874/PES.SI.02.007

Mehedintu, A., & Soava, G. (2023). Approach to the impact of digital technologies on sustainability reporting through structural equation modeling and artificial neural networks. Electronics (Basel), 12(9), 2048. https://doi.org/10.3390/electronics12092048

Prado-Lorenzo, J., Gallego-Alvarez, I., & Garcia-Sanchez, I. M. (2009). Stakeholder engagement and corporate social responsibility reporting: The ownership structure effect. Corporate Social-Responsibility and Environmental Management, 16(2), 94-107. https://doi.org/10.1002/csr.189

Lozano, R., & Huisingh, D. (2011). Inter-linking issues and dimensions in sustainability reporting. Journal of Cleaner Production, 19(2-3), 99-107. https://doi.org/10.1016/j.jclepro.2010.01.004

Sharma, S. (2023). Does ESG risk management ensure better risk management? evidence from india. Procedia Computer Science, 221, 912-919. https://doi.org/10.1016/j.procs.2023.08.068

Tamimi, N., & Sebastianelli, R. (2017). Transparency among S&P 500 companies: An analysis of ESG disclosure scores. Management Decision, 55(8), 1660-1680. https://doi.org/10.1108/MD-01-2017-0018

Zhang, Q., Ding, R., Chen, D., & Zhang, X. (2023). The effects of mandatory ESG disclosure on price discovery efficiency around the world. International Review of Financial Analysis, 89 https://doi.org/10.1016/j.irfa.2023.102811